

REMARKS / ARGUMENTS

I. General Remarks

Please consider the application in view of the following remarks. Applicants thank the Examiner for his careful consideration of this application.

II. Disposition of Claims

Claims 15-23, 28-30, 47-50, and 55-67 are pending in this application. Claims 1-14, 32-46, and 69-81 were cancelled in a previous response. Claims 24-27, 31, 51-54, and 68 have been withdrawn.

Claims 15-22, 29, 30, 47-49, 56-64, 66, and 67 stand rejected under 35 U.S.C. § 102(b). Claims 15-23, 28-30, 47-50, and 55-67 stand rejected under 35 U.S.C. § 103(a).

III. Remarks Regarding Previous Amendments

The Office Action notes that the listing of claims submitted with Applicants' previous response does not indicate the status of claims 68-81, and that it is unclear from the listing of claims and remarks in Applicants' previous response whether Applicants intended to cancel or withdraw claims 24-27, 31, 51-54, and 68-81. (*See* Office Action at page 3.) Applicants thank the Examiner for pointing out these omissions, and apologize for any confusion they may have caused. Accordingly, Applicants have indicated in this Response that claims 24-27, 31, 51-54, and 68 are withdrawn and claims 69-81 have been cancelled. Therefore, Applicants respectfully request entry of these amendments.

IV. Remarks Regarding the Election/Restriction Requirements

The Office Action notes that Applicants elected to prosecute the claims in Group I of the restriction and poly(orthoesters) as the species of degradable materials, and thus claims 24-27, 31, 51-54, and 68-81 drawn to a non-elected species and/or inventions are considered withdrawn. (*See* Office Action at page 4.) Accordingly, Applicants have cancelled claims 69-81, withdrawn claims 24-27, 31, 51-54, and 68 herein, and confirm that claims 15-23, 28-30, 47-50, and 55-67 are identified as falling within the elected species of poly(orthoesters) as degradable materials. Therefore, Applicants respectfully submit that they have now complied with the election/restriction requirements set forth in the Office Action.

V. Remarks Regarding Rejections of Claims

A. Rejections of Claims Under § 102(b)

Claims 15-22, 29, 30, 47-49, 56-64, 66, and 67 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,387,986 to Moradi-Araghi *et al.* (“*Moradi-Araghi*”).

With respect to these rejections, the Office Action states:

Applicant’s arguments regarding Moradhi-Araghi not “disclos[ing] a bridging agent comprising a degradable material” are inaccurate. As stated on page 10 of OA:

“Moradi discloses a gel-forming composition comprising a material encapsulated with a degradable first polymer ... and a weighting agent such as calcium carbonate ... *which can also act as a bridging agent* ... (see column 3, line 66 to column 4, line 27) ... [wherein] the degradable first polymer may be a polyorthoester (see column 3, lines 12-16 ... [that] can be used during drilling The capsules of the first polymer may be fairly small (see Example 1 and column 4) so [it] can act as a bridging agent. [Emphasis added]

Thus, Moradi-Araghi is disclosing a gel-forming composition for drilling comprising, *inter alia*, calcium carbonate (a bridging agent) and a degradable polyorthoester polymer. Calcium carbonate is a well-known, conventional bridging agent that is added to drilling or well treatment compositions to form a “bridge” along pores or fractures thereby building a filter cake to prevent loss of whole mud or filtrate. *See, e.g.*, the following references, by the same inventors (Todd and/or Munoz, Jr.) and assignee (Halliburton Energy) of the instant application, disclosing calcium carbonate as a common bridging agent and/or formation of filter cakes from common bridging materials, such as calcium carbonate: USPN 7,036,588 (col. 1, lines 16-44 of “Background of Invention”); USPN 7,021,377 (col. 1, line 11 to col. 2, line 36 of “Background of Invention”; col. 3, lines 59-65); USPN 6,983,798; col. 1, lines 12-53 of “Background of Invention”; and USPN 6,422,314 (col. 1, lines 11-53 of “Background of Invention”). Particularly, in paragraph [0004] of the “Background of Invention” section of U.S. Patent Application Publication No. 2005/0059556 to Munoz *et al.* (CIP of instant application), Applicants state that:

“Subterranean treatment fluids further may comprise bridging agents, which may aid in preventing or reducing loss of the treatment fluid to, *inter alia*, natural fractures within the subterranean formation. Calcium carbonate is an example of a conventional bridging agent. ... Generally, bridging agents are desired to form

fast and efficient filter cakes on the walls of the well bores within the producing formations to minimize potential leak-off and damage. Generally, the filter cakes are removed before hydrocarbons are produced from the formation.”

Accordingly, Applicants themselves have acknowledged that the presence of calcium carbonate in a drilling fluid aids in preventing or reducing fluid loss by forming filter cakes on the walls of well bores to minimize leakage. In addition, Applicants in the instant specification disclose blends of bridging agent/degradable materials, such as calcium carbonate and poly(lactic)acid (paragraph [0032]), and that the degradable material can be of any preferred size and shape, such as shavings, flakes, strips, spheroids, pellets and tablets (paragraph [0035]). Thus, the drilling fluid disclosed in the instant specification encompasses a composition containing calcium carbonate as a bridging agent and a degradable polymer as an encapsulant.

In addition, in the only sample of the composition provided in instant specification (Example 1), the disclosed composition contains aqueous sodium chloride, a liquid xanthan biopolymer, a starch derivative, powdered polylactic acid and calcium carbonate. Because the powdered polylactic acid is the degradable polymer component, whereas the calcium carbonate must be the bridging agent, the phrase “bridging agent comprising a degradable material” used throughout the specification and claims, must encompass the situation wherein the bridging material and the degradable polymer are simply mixed together in the composition.

Consequently, Moradi-Araghi’s gel-forming drilling composition comprising, *inter alia*, a degradable polyorthoester polymer and bridging material (calcium carbonate) anticipates the instant claims.

(Office Action at pages 6-9.) Applicants respectfully disagree.

In order to form a basis for a rejection under 35 U.S.C. § 102(b), a prior art reference must disclose each and every element as set forth in the claim. MPEP § 2131. Applicants respectfully maintain that *Moradi-Araghi* does not disclose every element of Applicants’ claims because *Moradi-Araghi* does not disclose a bridging agent comprising a degradable material, as recited in claims 15 and 47, or the steps of forming a self-degrading filter cake that comprises that degradable material bridging agent, and allowing that filter cake to degrade, as recited in claim 15. Therefore, *Moradi-Araghi* cannot anticipate Applicants’ claims.

First, Applicants respectfully reiterate that *Moradi-Araghi* does not disclose a bridging agent that comprises a degradable material. The Office Action appears to assert that *Moradi-Araghi*'s teaching of a calcium carbonate bridging agent and a separate degradable material encapsulant on a crosslinking agent anticipates this element. However, Applicants' claims clearly require a bridging agent that comprises a degradable material, and thus even if *Moradi-Araghi* teaches the use of other bridging agents in the same fluid as a degradable material, this does not teach a bridging agent that itself comprises a degradable material. A degradable material that is simply present in the same fluid as a different bridging agent cannot literally anticipate this element. See MPEP § 2131 ("A claim is anticipated only if each and every element as set forth in the claim is found . . . in a single prior art reference. . . . The identical invention must be shown in as complete detail as is contained in the . . . claim." (emphasis added)). Since the degradable material encapsulant in *Moradi-Araghi* encapsulates the crosslinking agent, and does not comprise the bridging agent, *Moradi-Araghi* does not anticipate this element.

The Office Action appears to rely on Example 1 of Applicants' specification to support the assumption that the degradable material encapsulating the crosslinking agent in *Moradi-Araghi* anticipates Applicants' claims because the degradable material in *Moradi-Araghi* "mixed together in the composition" with a calcium carbonate bridging agent constitutes "a bridging agent comprising a degradable material." (See Office Action at page 8.) Respectfully, this assumption is false. Example 1 describes a specific powdered degradable material – which itself constitutes the bridging agent – mixed into a fluid as a bridging agent. It does not follow that the degradable material in *Moradi-Araghi* necessarily serves as a bridging agent or becomes incorporated into another bridging agent when it is present in the same fluid as another bridging agent. The Office Action provides no basis in technical reasoning within the knowledge of one skilled in the art to support the assumption that a degradable material encapsulating a crosslinking agent as disclosed in *Moradi-Araghi* will act as or become part of a bridging agent when mixed into a fluid.

Rather, as Applicants' stated in their previous response, the degradable material disclosed in *Moradi-Araghi* will not act as a bridging agent. The degradable material encapsulant in *Moradi-Araghi* must degrade to release the crosslinking agent in order to form a gel (see *Moradi-Araghi* at col. 3, ll. 8-9). However, this gelation and degradation of the

degradable material would occur in the fluid before the degradable material would ever act as a bridging agent (e.g., bridge the pore spaces on the formation matrix). Moreover, there is no teaching in *Moradi-Araghi* of a degradable material that would be of an appropriate size to act as a bridging agent. *Moradi-Araghi* states that the polymer that comprises a degradable material may have a molecular weight in the range of from about 10,000 to about 30,000,000 (see *Moradi-Araghi* at Example 1 and column 4, ll. 52-59), but this does not indicate the particle size of those degradable materials, or whether they are of an appropriate size to act as a bridging agent.

Finally, with respect to claim 15, Applicants respectfully reiterate that *Moradi-Araghi* does not disclose the steps of forming a self-degrading filter cake that comprises the degradable material bridging agent, and allowing that filter cake to self-degrade. *Moradi-Araghi* does not mention the creation or degradation of a filter cake at all, much less a filter cake that includes the degradable material bridging agent. In fact, the degradable material in *Moradi-Araghi* should no longer be present in the fluid or in the subterranean formation by the time a filter cake is formed, since the degradable material encapsulant must degrade in the fluid to release the crosslinking agent and gel the fluid. (See *Moradi-Araghi* at col. 3, ll. 8-9.) Thus, *Moradi-Araghi* does not disclose any process that would form a self-degrading filter cake that comprises the degradable material bridging agent, and therefore cannot anticipate claim 15.

Therefore, because *Moradi-Araghi* does not disclose these elements recited in claims 15 and 47, *Moradi-Araghi* cannot anticipate these claims, and claims 15 and 47 are allowable over *Moradi-Araghi*. Moreover, since “a claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers,” and since claims 16-22, 29, 30, 48, 49, 56-64, 66, and 67 depend, either directly or indirectly, from independent claim 15 or 47, these dependent claims are allowable for at least the same reasons. See 35 U.S.C. § 112 ¶ 4 (2004). Accordingly, Applicants respectfully requests the withdrawal of these rejections.

B. Rejections of Claims Under § 103(a)

1. Rejections of Claims 15-22, 29, 30, 47-49, 56-64, 66, and 67 Over *Moradi-Araghi*

Claims 15-22, 29, 30, 47-49, 56-64, 66, and 67 stand rejected under § 103(a) as being unpatentable over *Moradi-Araghi* in the alternative to the § 102(b) rejections of those claims discussed above. With respect to these rejections, the Office Action states:

Applicant's arguments regarding the 35 U.S.C. 103 rejection of claims 15-22, 29-30, 47-49, 56-64 and 66-67 as obvious over Moradi-Araghi (item 11 on page 10 of OA) have been fully considered but they are found not persuasive.

Applicant's arguments regarding the patentability of claims 15-22, 29, 30, 47-49, 56-64 and 66-67 over Moradi-Araghi were addressed above in the immediately preceding paragraph and the response to said arguments is incorporated herein.

In response to Applicant's argument that "the uses of the degradable materials in *Moradi-Araghi* are totally different from those of the present invention" a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure or composition is capable of performing the intended use (calcium carbonate as bridging agent in Moradi-Araghi's composition containing polyorthoester as discussed above in paragraph #16), then it anticipates or obviates the claim.

Applicant's arguments regarding the 35 U.S.C. 103 rejection of claims 15, 23, 47, 50 and 65 as unpatentable over Moradi-Araghi have been fully considered but they are not persuasive.

Examiner's discussion of Applicant's arguments concerning Moradi-Araghi of paragraphs #16 and 17 apply equally to the instant rejection and are incorporated herein.

Applicant's arguments regarding Moradi-Araghi disclosing different uses than Applicant had envisaged for the degradable component polymer of Moradi-Araghi's composition are inaccurate. Both compositions are disclosed for use in drilling and well-treatment applications, particularly for preventing fluid/water loss. *See* Moradi-Araghi (Col. 6, lines 56-65) and the instant specification (paragraph #9).

Moreover, as stated previously, a recitation of an intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to *patentably distinguish* the claimed composition (and its process of use) from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

In addition, Examiner notes that Applicant did not traverse the assertions in item 14 of OA regarding the use of plasticizers and hydroxyethylcellulose as a fluid loss agent being well known in the art.

(Office Action at page 9-11.) Applicants respectfully disagree with these rejections.

First, in order to form a basis for a rejection under 35 U.S.C. § 103(a), a prior art reference must teach or suggest each and every element as set forth in the claim. MPEP § 2143.03 (2005). Applicants respectfully reiterate that *Moradi-Araghi* does not teach or suggest a bridging agent comprising a degradable material, as recited in claims 15 and 47, or the steps of forming a filter cake that comprises that bridging agent comprising a degradable material, and allowing that filter cake to degrade, as recited in claim 15. The Office Action asserts that a prior art structure is capable of performing the claimed use obviates that claim. However, in addressing the § 102(b) rejection in Section V.A. above, Applicants have explained the clear structural and functional differences between the bridging agent comprising a degradable material required in claims 15 and 47, and the encapsulant comprising a degradable material as disclosed in *Moradi-Araghi*. Applicants have shown that the degradable materials disclosed in *Moradi-Araghi* do not constitute a bridging agent, are not necessarily of an appropriate size to act as a bridging agent, and cannot form a self-degrading filter cake. Thus, *Moradi-Araghi* does not teach or suggest anything that can meet these elements of claims 15 and 47, as required for a rejection under § 103(a).

It is not clear what additional rationale or modification of *Moradi-Araghi* would supply these elements for the rejection of these claims under § 103(a) over *Moradi-Araghi*. To the extent that the § 103(a) rejection is based on a modification of *Moradi-Araghi* that modifies a bridging agent taught therein to include a degradable material, or a modification of the degradable material encapsulant to act as a bridging agent and/or form a self-degrading filter cake, Applicants respectfully disagree with any such rejection.

In order for the modification of a prior art reference to be obvious, there must be some suggestion, in the prior art, the nature of the problem to be solved, or within the knowledge of one skilled in the art, to make that modification. See MPEP § 2143.01 (citing *In re Rouffet*, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998)). However, as Applicants noted in their previous response, there is no such teaching in *Moradi-Araghi* itself, and nothing within the knowledge of one of ordinary skill in the art would support modifying *Moradi-Araghi* to include a bridging agent that comprises a degradable material, or to form a filter cake comprising that bridging agent. Moreover, any modification of *Moradi-Araghi* to make such a modification would be an unobvious one, among other reasons, since the uses of the degradable materials in *Moradi-*

Araghi are different from those of Applicants' invention. See MPEP § 2143.01 ("nature of the problem to be solved" may indicate motivation to combine or modify prior art). Applicants' claims recite the use of degradable materials as bridging agents that, *inter alia*, form a self-degrading filter cake, whereas the degradable polymers disclosed in *Moradi-Araghi* are used to encapsulate a crosslinking agent to provide a gel-forming composition with a slower gel formation rate. (See *Moradi-Araghi* at col. 1, ll. 36-38, col. 2, ll. 23-26.) The use of degradable polymers as encapsulants in *Moradi-Araghi*, even when used in drilling and well treatment applications similar to those where Applicants' claimed methods and compositions may be used, will require different types and sizes of degradable polymer capsules from those that would be necessary for the degradable material to act as a bridging agent or to form a self-degrading filter cake in a subterranean formation.

Moreover, this modification of *Moradi-Araghi* to formulate the degradable material to act as a bridging agent "would render the [*Moradi-Araghi*] invention being modified unsatisfactory for its intended purpose," and thus there can be "no suggestion or motivation to make the proposed modification." See MPEP § 2143.01 (citing *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)). The degradable material encapsulant in *Moradi-Araghi* must be allowed to degrade in the fluid in order to release the crosslinking agent into the fluid. (See *Moradi-Araghi* at col. 3, ll. 8-9.) In this case, a modification of *Moradi-Araghi* to act as a bridging agent necessarily would prevent degradable material encapsulant from degrading until a filter cake is at least partially formed, which would prevent the encapsulant from releasing the crosslinking agent as contemplated in *Moradi-Araghi*. Therefore, *Moradi-Araghi* would not motivate a person of skill in the art to modify the degradable polymer encapsulants disclosed therein to make or use a degradable material bridging agent, as recited in Applicants' claims, and thus those claims are not obvious in view of *Moradi-Araghi*.

Therefore, because *Moradi-Araghi* does not teach or suggest all elements of claims 15 and 47, and does not provide a motivation to modify *Moradi-Araghi* to include those elements, Applicants respectfully assert that *Moradi-Araghi* cannot obviate these claims, and claims 15 and 47 are allowable over *Moradi-Araghi*. Moreover, since "a claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers," and since claims 16-22, 29, 30, 48, 49, 56-64, 66, and 67 depend, either directly or indirectly, from independent claim 15 or 47, these dependent claims are allowable for at least the

same reasons. *See* 35 U.S.C. § 112 ¶ 4 (2004). Accordingly, Applicants respectfully requests the withdrawal of these rejections.

2. Rejections of Claims 28 and 55 Over *Moradi-Araghi* in View of *Dobson*, *Himes*, or *Cowan*

Claims 28 and 55 stand rejected under 35 U.S.C. § 103(a) as unpatentable over *Moradi-Araghi* in view of U.S. Patent No. 5,728,652 to Dobson *et al.* ("*Dobson*"), U.S. Patent No. 5,191,931 to Himes *et al.* ("*Himes*"), or U.S. Patent No. 4,531,594 to Cowan ("*Cowan*").

With respect to these rejections, the Office Action states:

Moradi-Araghi has been discussed previously. Moradi-Araghi is silent regarding the particle size of the various components of the drilling fluid composition, such as the bridging agent and the degradable polymer.

However, it is well known in the prior art to optimize particle size for drilling fluid components, such as a bridging agent, a degradable polymer or other fluid-loss control additives dependent on the particular application/formation.

For example, Dobson teaches that bridging agents are routinely sized to have a particular size distribution sufficient to seal off pores (col. 5, lines 51-65). Himes teaches that particle sizes of solid materials of a drilling composition are manipulated to bridge formation pores to prevent fluid loss (Abstract). Cowan discusses design variability of particle size of fluid-loss control additives in drilling fluids to provide enhanced fluid loss prevention (col. 5, lines 29-43).

Therefore, it would have been obvious to a person of ordinary skill in the art to optimize the particle size of the bridging agent/degradable polymer of a drilling fluid composition in accordance with the particular formation the fluid is applied to. One skilled in the art would have been motivated to do so to incorporate the teachings of Dobson, Himes or Cowan and attain a superior drilling fluid having effective bridging of the formation pores and, thus, enhanced fluid loss protection.

Thus, claims 28 and 55 remain unpatentable as obvious over Moradi-Araghi.

(Office Action at page 5.) Applicants respectfully disagree with these rejections.

In order for the modification of a prior art reference to be obvious, there must be some suggestion, in the prior art, the nature of the problem to be solved, or within the knowledge of one skilled in the art, to make that modification. *See* MPEP § 2143.01 (citing *In re Rouffet*, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998)). Moreover, where a "proposed modification would

render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” See MPEP § 2143.01 (citing *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)). In this case, a modification of *Moradi-Araghi* to optimize the particle size of the degradable polymer encapsulants disclosed therein to act as an effective bridging agent would render those degradable polymers unsatisfactory for the purpose contemplated in *Moradi-Araghi* of temporarily encapsulating a crosslinking agent and then releasing that crosslinking agent after a delay. If the degradable polymer is optimized to act as a bridging agent (as recited in claims 15 and 47, from which claims 28 and 55 depend) with the particle sizes in the range recited in claims 28 and 55, it will not be permitted to degrade to release an encapsulated crosslinking agent into the fluid while in the subterranean formation. Therefore, even if *Dobson*, *Himes*, and *Cowan* teach the optimization of the particle sizes of bridging agents, the proposed combinations of these references with *Moradi-Araghi* to obviate claims 28 and 55 are improper.

Therefore, because there is no motivation to combine *Moradi-Araghi* with *Dobson*, *Himes*, or *Cowan* to include all elements of claims 28 and 55, those claims are patentable over those combinations of references. Accordingly, Applicants respectfully requests the withdrawal of these rejections.

SUMMARY

In light of the above remarks, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections. Applicants further submit that the application is now in condition for allowance, and earnestly solicit timely notice of the same. Should the Examiner have any questions, comments or suggestions in furtherance of the prosecution of this application, the Examiner is invited to contact the attorney of record by telephone, facsimile, or electronic mail.

Applicants believe that there are no fees due in association with this filing of this Response. However, should the Commissioner deem that any additional fees are due, including any fees for extensions of time, Applicants respectfully request that the Commissioner accept this as a Petition Therefor, and direct that any additional fees be charged to the Deposit Account of Halliburton Energy Services, Inc., No. 08-0300.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Robert A. Kent", written over a horizontal line.

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